Guide to Using Applications for the TI-83 Plus/TI-84 Plus Graphic Calculator to Support Teaching Algebra In MINZC (Years 9 – 13)

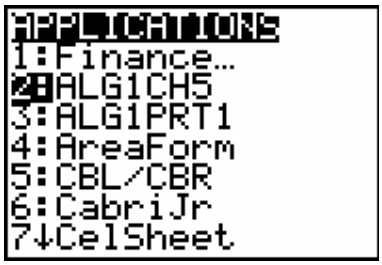
Many apps include interactive tasks and games which can be used to follow the teaching of new algebra skills and knowledge with an alternative to text book based practice. As many teachers know, using instructional games can also be effective in addressing resistant learning. It is a real pleasure to find how useful such interactive games are in engaging students in their learning mathematics at all levels.

I use these apps as a warm up, for maintenance, as homework practice, or to replace text book based work. My students work either with me, cooperatively or solo, in pairs, groups and so on.

Accessing the Apps

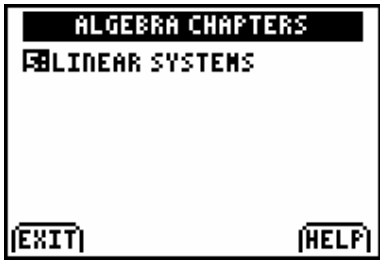
ALG1PRT1 contains 4 chapters of Algebra instructions, examples and activity or games. **ALG1CH5** contains the final Chapter. Both are available as free downloads for the TI-83 Plus and TI-84 Plus family from www.education.ti.com . Instructions on how to download are also available on the site.

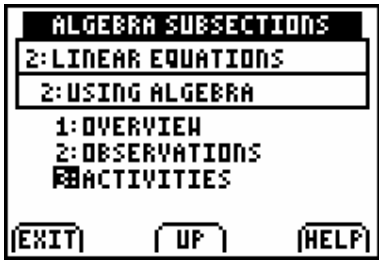
Once installed, press [APPS], then scroll through the app.s numeric index and press [ENTER], or just type the appropriate index number to start the app.

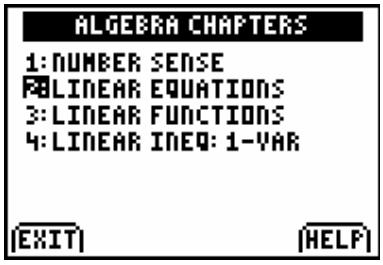


Start at the Beginning!

If, as happened here for me with **ALG1PRT1**, the app has been in use, you will need to return to the top level by pressing appropriate **UP** , or pressing: [2nd], [MODE] (**QUIT**) keys in the absence of up options, repeatedly, until you reach the top level with its 4 Chapters, shown in the final of the next three screen shots.





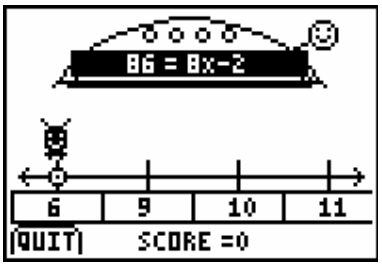


From the top level, simply follow the app. pathway outlined in the table that follows.

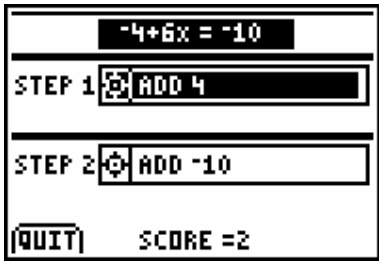
Navigating

As you navigate, use the appropriate number strokes. To Navigate past the owl, press the right arrow ▶ key. To start an activity or game press: [ENTER] and use the [F1] ([ENTER]) through to [F5] ([GRAPH]) keys immediately below the calculator screen.

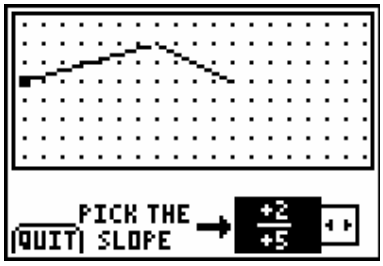
Now let's look at some of the activities:



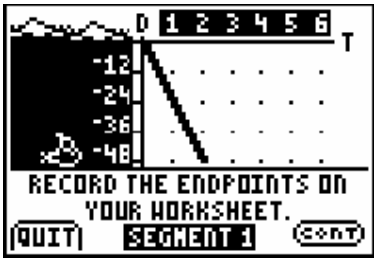
Beam Dale Up: Solve a linear equation by inspection or by substitution.



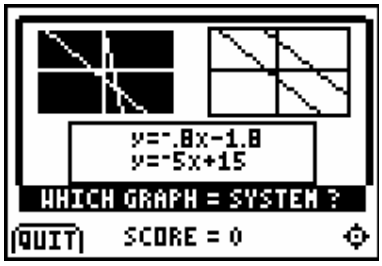
Solve It!: Choose correct strategies to solve linear equations or inequalities.



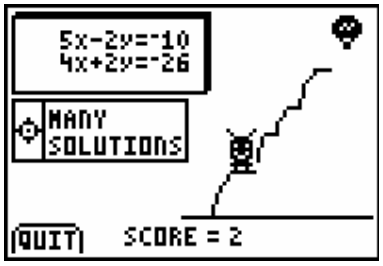
Screen Cross: match a drawn gradient with a fraction. Also available in a form using coordinates to calculate gradient.



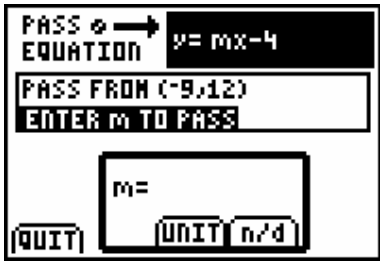
Dive! Use points to find gradients.

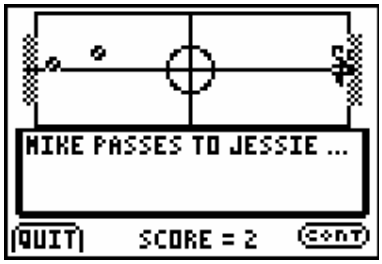


System Match It!: match a system of linear equations with their graphical, tabular, or algebraic forms. All combinations are covered.



Balloon Ride: solve systems of simultaneous equations by substitution or algebra.





Line Soccer: rearrange *y = mx + c* to find gradient, test a point, or to find a point on the line.

Teaching Objective	App	App pathway	MINZC Ref.	Instructions	Notes
Demonstrate understanding of the Associative, Distributive, and Commutative Properties	Alg 1 Prt 1	→1:Number Sense →3:Real Numbers →3:Activities	A 5.7, 9,	Users are given scores for correct answers to questions where they identify equivalent expression transformed by the application of the associative, commutative, or distributive properties	These terms are not generally taught as a topic today, but the concepts are still useful with respect to combining terms
Solve 1-step linear euations	Alg 1 Prt 1	→2:Linear Equations →1:Using Graphs and Tables →3:Activities →1: Beam Dale Up	A 3.5		Space Invaders, type game with good feedback
Understanding the equation solving process - Choose the correct Operation or step to solve a 1-step or 2-step linear equation - Solve the equation	Alg 1 Prt 1	→2:Linear Equations →2:Using Algebra →3:Activites →1:Solve It!	A 3.5, 4.5	Play at Silver level for 1-step equations, Gold level for 2-step equations	
	Alg 1 Prt 1	→2:Linear Equations →2:Using Algebra →3:Activities →2:Beam Dale Up	A 3.5, 4.5, 5.5, 5.6		Have students play in pairs, 1 using an ordinary calculator to perform the number work, or use 2 calculators
	Alg 1 Prt 1	→2:Linear Equations →2:Using Algebra →3:Activities →3:Free Fall	A 3.5, 4.5, 5.5, 5.6	Suitable for mid to high ability students at Years 9 and 10 and even Year 11.	Race against the clock to solve 1 or 2-step equations. Unsolved equations are displayed for further work.
Match Gradient on a grid with a Fraction	Alg 1 Prt 1	→3:Linear Functions →1:Slope With Grid →3:Activities →1:Screen Cross	A 5.4,	Useful for Years 9, 10 and 11	A version can be played in pairs if calculators are linked

Use 2 points to calculate a gradient	Alg 1 Prt 1	→3:Linear Functions →2:Slope Using Coordinates →3:Activities →1:Screen Cross	A 5. 4, 6.1	Useful for Years 9, 10 and 11, even for practice for Year 12s.	
Gradient – intercept in context with rates of change	Alg 1 Prt 1	→2:Linear Functions →3:Slope Using Rates of Change →3:Activities →1:Balloon Speed OR 2:Dive!	A 5.1 – 7, 10		Neat visual contexts for calculating gradients using rise/run
Match a linear equation in $y=mx+c$ form against its graph OR its table	Alg 1 Prt 1	→3:Linear Functions →4:Slope-Intercept Form →3:Activities →1:Match It!	A 4.6, A 5.1 - 7	At Years 9 and 10, very useful for maintaining the link between the table, algebraic and graphic forms of a linear function	
Change the Subject of the linear equation in $y=mx+c$ form, changing the subject to… ○ Substitute into an equation to check whether a point is on a line ○ Calculate m ○ Calculate c ○ Calculate m and b	Alg 1 Prt 1	→3:Linear Functions →4:Slope-Intercept Form →3:Activities →2:Line Soccer	A 5.0 - 6	Suitable for good Years 10, for all Year 11 and 12, for graphs units and changing the subject in algebra, and for CAS classes using the **solve** command	Just in time for the World Cup!
Use test points and substitution to solve an inequation	Alg 1 Prt 1	→4:Linear Inequalities: 1-variable →1:Using Graphs and Tables →3:Activities →1:Build the Solution Set	A 6.5	Suitable for Year 11, as well as Year 10s learning inequalities	
	Alg 1 Prt 1	→4:Linear Inequalities: 1-variable →2:Using Algebra →3:Activities →1:Solve It!			Reinforces the process well, without unnecessary number crunching

Pick the steps to solve an inequality	Alg 1 Prt 1	→4:Linear Inequalities: 1-variable →2:Using Algebra →3:Activities →2:Free Fall	A 6.5		Race the clock to solve inequalities – demanding of the best students in Years 10 and 11
Comparing Linear Functions in graph, algebraic or table and identifying systems of simultaneous equations	Alg1 Prt 5	→5:Linear Systems →1:Using Graphs and Tables →3:Activities →1:System Match It!	A 6.5, 6		
Identify systems as (In)Consistent and /or (In)Dependent	Alg1 Prt 5	→5:Linear Systems →2:Using Algebra →3:Activities →1:What am I?	A 6.5, 6	Suitable For Years 12 and 13 studying systems of equations	
Solve Simultaneous equations	Alg1 Prt 5	→5:Linear Systems →2:Using Algebra →3:Activities →2:Balloon Ride	A 6.5, 6,	Very engaging for Years 11 or Year 10 CAS classes	

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Andrew Tideswell is Project Director for MOTIS (Mobile Technology in the Sciences), a 3 year project, funded by the New Zealand Ministry of Education, with support from Texas Instruments, Australian Catholic University (Canberra) and Core (previously Ultralab South) developing the use of hand held and mobile technologies in mathematics and the sciences in New Zealand secondary schools.